CHAPTER 1. INTRODUCTION

From 1963 through the mid 1970s, the Massachusetts Division of Marine Fisheries (DMF) produced monographs on seventeen estuaries along the Massachusetts coast. These studies were undertaken as a result of recommendations of the 1960 Massachusetts Marine Fisheries Advisory Commission to the Governor of the Commonwealth. Each monograph was based on one year of field study that focused on the physical characteristics, water quality, and fish and shellfish resources of the estuary. The reports also contained important historical information on the fisheries supported by each estuary, sometimes dating back to colonial times. Since these monographs are recognized as a valuable source of baseline data, a number of agencies and researchers, including DMF, have suggested that the studies be repeated periodically so that changes over time could be examined (DMF 1985, EOEA 1991, Leigh Bridges DMF, pers. comm).

The opportunity to reexamine and update the 1968 Parker River-Plum Island Sound monograph came in 1997 as a result of funding from the Massachusetts Office of Coastal Zone Management. The Massachusetts Audubon Society's North Shore Conservation Advocacy Office (MAS:NS) received a contract to carry out the work and subcontracted out part of the effort to the Parker River Clean Water Association (PRCWA). Both organizations are familiar with the region and have carried out recent projects about the marine resources of the Plum Island Sound region, as described below.

In 1991, MAS:NS was funded by the Massachusetts Bays Program to carry out the Plum Island Sound Minibay Project. This project included a reexamination of the fisheries resources that had been described in DMF's 1968 monograph on the Parker River-Plum Island Sound estuary. It also included studies of fecal coliform contamination of the Sound and its tributary rivers, an assessment of current and anticipated future land uses, an examination of the flushing characteristics of the Sound, an examination of historical and current data on bird use of Plum Island and environs, and a management plan for the region.

The Parker River Clean Water Association is a citizens-based watershed association that was formed in 1995 to address water resource issues on the Parker River. Its focus has been on water quality in the Parker River and its tributaries, the impact of tidal restrictions on salt marsh habitats, and the condition of the anadromous fishways of the Parker River.

1.1. PERSONNEL AND ACKNOWLEDGEMENTS

The original study of the marine resources of the Parker River-Plum Island Sound estuary was conducted and the report written by Marine Fisheries Biologist William C. Jerome, Jr., Assistant Marine Fisheries Biologists, Arthur P. Chesmore and Charles O. Anderson, Jr., and Daniel G. Lyons, Skilled Conservation Helper. Student assistants,

Warren S. Collings, Stuart Wyman and Robert Nersasian supplemented team personnel during the summer of 1965. Frank Grice, Chief of Research, and Frederick C. Wilbour, Jr., Director of the Division of Marine Fisheries, provided over-all supervision of the estuarine programs. Commercial fishermen, sportsmen, and personnel from the Massachusetts Department of Public Health, Parker River National Wildlife Refuge, U. S. Coast Guard, U. S. Geological Survey, U. S. Bureau of Commercial Fisheries, and University of New Hampshire (Botany Department) also contributed valuable data.

Much of the update of the 1968 monograph is based on the Plum Island Sound Minibay Project, a collaborative effort between a number of organizations coordinated by MAS:NS. Some of the project participants are indicated in the chapter headings. Massachusetts Audubon collaboratively with Dr. Linda Deegan, Robert Garritt and colleagues at the Woods Hole Ecosystems Center carried out the fisheries component of the project. Applied Sciences Associates, Inc. of Narragansett, Rhode Island performed the flushing studies under the direction of Dr. Henry Rines and Christopher Turner. Horsley-Witten, Inc. carried out the stormwater modeling. Andrea Cooper contributed to sections dealing with land use and management issues and Joan LeBlanc wrote various sections of the Minibay project report that were incorporated into this report. Many MAS and PRCWA volunteers aided in data collection and members of the PRCWA also helped with some of the writing.

Many volunteers assisted with the field collections and the sorting and counting of fish. We particularly acknowledge the assistance of volunteers Mary Kingsley and Richard and Pinckney Johnson. Past and present DMF personnel provided valuable guidance to the Minibay project and to this document. William Jerome, who directed the 1968 monograph team, served as an advisor to the Minibay project. Additional insights into the comparability of the two efforts were gained through conversations with H. Russell Iwanowicz. Jeff Kennedy and Wayne Castonguay of DMF provided advice on the bacterial studies of the Sound and shellfish bed locations.

In addition to DMF personnel, Jack Grundstrom, David Mountain, Steve Barrett, Philip Kent, Mark Baker, Verne Noyes and Joan Beskinis contributed to a number of sections of this document. Ricky Holt contributed to the section on habitat issues and Amy Prime and the Parker River National Wildlife Refuge to the section on birds. We also acknowledge the help of George Thompson whose clamming maps provided a basis for the shellfish maps. The shellfish maps were done in conjunction with Jerrard Whitten of the Merrimack Valley Planning Commission through technical assistance kindly allocated by the Towns of Ipswich, Rowley and Newbury. Rebecca Haney, coastal geologist for Massachusetts Office of Coastal Zone Management, reviewed the chapter on geology and morphology.

Direct funding for this project came from the Massachusetts Office of Coastal Zone Management. The Massachusetts Bays Program and the Land Margin Ecosystems Research program of the National Science Foundation funded the research that contributed to updating the old monograph.

1.2. OBJECTIVES

The basic objective of the original DMF study of the marine resources of Parker River-Plum Island Sound was to determine the type, status and value of commercially valuable resources and to obtain data concerning the physical and chemical characteristics which affect those resources. An investigation of the species of finfish, shellfish, and crustaceans present, their abundance and the degree of exploitation of certain species by sport and commercial fishermen, was conducted to provide statistical evidence of the economic value of the fisheries in the area during the study period. The objective of this update is to examine the status of the marine resources and water quality in Plum Island Sound with particular emphasis on finfish and bacterial contamination. The existence of two data sets collected in a similar manner provides a unique opportunity to compare long term changes in an estuarine ecosystem and to identify trends. The more recent data can also be placed within the historical context of the fisheries, since the 1968 monograph examined historical records on fisheries over several centuries.

1.3. Study Area

Both the original DMF estuarine monograph and the Plum Island Sound Minibay Project established the upper boundaries of the study area near the head of tidewater in the Parker River, and in the Plum Island River near the mouth of Pine Island Creek (Fig. 1.1). The Plum Island River south of this location is under the tidal influence of the Parker River-Plum Island Sound estuary and north of this point, under the tidal influence of the Merrimack River. The lower or seaward boundary was established as a line from the southern tip of Plum Island to Castle Neck, Ipswich, where the estuary flows into Ipswich Bay. Sampling for the 1968 study was limited to the estuarine portions of the Sound, the Parker River, the Ipswich River, and other smaller tributaries. Water quality sampling in the Minibay project included some of the freshwater sections of the rivers leading in to the Sound. Fish sampling in the DMF study included a station in Ipswich Bay.

Fig. 1.1. Study Area

2 0 2 4 Kilometers